

Unconventional materials at school: teaching experiences and educational potential

Monica Guerra

Italy

Abstract

The theme of context has long represented a growing focus for pedagogical and didactic reflection and research; within this line of enquiry, spaces and materials are recognized to play a key role in shaping the mediation tools and strategies that teachers intentionally adopt to support children through significant learning processes.

This study was part of a broader research programme regarding objects and materials in education and had the specific aim of exploring the potential role of unstructured materials, particularly those of an informal and undefined nature such as industrial waste products, within the educational programmes of early childhood services and schools.

The initial research hypothesis was that use of highly unstructured materials would stimulate novel play and learning experiences in a contemporary manner, and would also encourage experimentation with a range of both expressive and cognitive exploration strategies. The reflections presented here were developed in the course of a training-research project that involved planning, testing and systematically observing preschool teaching programmes, with the primary aim of identifying the actions undertaken by the children when they encountered the materials under study.

Materiales no convencionales en la escuela: experiencias didácticas y potencialidad formativa.

Monica Guerra

Italia

Resumen

El tema del contexto constituye, ya desde hace tiempo y cada vez más, un ámbito de reflexión e investigación didáctica y pedagógica, en el que se les reconoce tanto espacios como materiales un papel importante entre los instrumentos y estrategias de mediación didáctica, a través de los cuales toman forma las elecciones intencionales que el profesor hace para apoyar procesos de aprendizaje significativos con los niños.

Este trabajo forma parte de una investigación más amplia sobre objetos y materiales en educación y se propone examinar específicamente el papel que los materiales no estructurados, con especial referencia a aquellos que cuentan con altos niveles de informalidad e indefinición como residuos industriales, pueden tener dentro de las propuestas de los servicios educativos para niños y de las escuelas.

Partiendo de la hipótesis de que el uso de materiales particularmente no estructurados pueda estimular diferentes experiencias de juego y aprendizaje contemporáneas, así como la experimentación con estrategias divergentes no sólo en la dirección de exploración de tipo expresivo, sino también de tipo cognitivo, se presentan algunas reflexiones surgidas en el ámbito de un proyecto de investigación-formación, que preveía la planificación, experimentación y observación sistemática de las propuestas didácticas de escuelas infantiles, con el objetivo de identificar las acciones llevadas a cabo por los niños

Analysis of the documentation collected indicated that these materials have interesting potential for use at preschool level, especially in terms of providing multidisciplinary and complex experiences. In particular, it seems that the use of such products intrinsically requires both adults and children to engage in planning and research.

Key words: context, materials, unstructured materials, teaching methods, teaching mediation, preschool.

quando se encontraban con materiales con las característica descritas anteriormente.

El análisis de la documentación recopilada ha puesto de manifiesto algunas potencialidades de interés en relación a este tipo de material, especialmente en lo que se refiere a la multidisciplinariedad y complejidad de las experiencias llevadas a cabo, lo que indica que el uso de estos materiales requiere de manera intrínseca de una planificación e investigación tanto por parte de los adultos como de los niños.

Palabras Clave: contexto, materiales, materiales no estructurados, didáctica, mediación didáctica, escuelas infantiles.

Materiali non convenzionali a scuola: esperienze didattiche e potenzialità formative.

Monica Guerra

Italia

Riassunto

Il tema del contesto costituisce da tempo e sempre più un ambito di riflessione e ricerca pedagogica e didattica, nel quale è riconosciuto a spazi e materiali un ruolo di rilievo tra gli strumenti e le strategie della mediazione didattica, attraverso cui prendono forma le scelte intenzionali che l'insegnante fa per sostenere significativi processi di apprendimento con i bambini.

Il presente contributo si colloca all'interno di una più ampia indagine su oggetti e materiali in educazione e intende nello specifico approfondire il ruolo che i materiali non strutturati, con particolare riferimento a quelli che presentano caratteristiche di elevata informalità ed indefinitezza quali quelli di scarto industriale, possono avere all'interno delle proposte dei servizi educativi per l'infanzia e delle scuole.

Muovendo dall'ipotesi che l'utilizzo di materiali particolarmente non strutturati possa sollecitare differenti esperienze di gioco e apprendimento anche in modo contemporaneo, oltre che la sperimentazione di strategie divergenti non solo

nella direzione di esplorazioni di tipo espressivo, ma anche di tipo cognitivo, vengono presentate alcune riflessioni maturate nell'ambito di un progetto di ricerca-formazione che ha previsto la progettazione, la sperimentazione e l'osservazione sistematica di percorsi didattici all'interno di scuole dell'infanzia, con l'obiettivo di rilevare le azioni messe in atto dai bambini nell'incontro con materiali che presentassero le caratteristiche descritte.

L'analisi delle documentazioni raccolte ha permesso di evidenziare alcune potenzialità di interesse, in particolare nella direzione della multidisciplinarietà e della complessità delle esperienze, indicando una intrinseca dimensione progettuale e di ricerca, per i bambini come per gli adulti.

Parole chiave: contesto, materiali, materiali non strutturati, didattica, mediazione didattica, scuole dell'infanzia.

Education, as widely acknowledged today, takes place inside a concrete, material dimension that acts on and influences the processes occurring within it. Educational relationships, words and actions take shape within specific contexts that may or may not echo them, reverberate with them, reinforce them: they will inevitably be either amplified or diminished in line with the potential contained in the context.

The power of context – with all that makes it up – is therefore a long-standing focus for psychopedagogical reflection. Of particular interest – amongst other reasons so as to avoid over-emphasis of the primarily functionalist and instrumental value of space – is the work of scholars who, drawing on Kurt Lewin's (1951) concept of psychological environment, have adopted an ecological approach (Bronfenbrenner, 1979) to designing space (Varin, 1985), examining the issues and dimensions making up the complex relationship between children and environments. In this perspective, the connection between environment and individual is made explicit and is considered reciprocal: research in this area has shown that the layout and organization of learning spaces directly influences children's actions, for example, in terms of reducing conflictual behaviours or encouraging aggressive conduct; facilitating continuity of play or leading to a low level of participation; supporting communication and stimulating cooperative play or hindering exchange, etc. (ibidem).

In the incessant dialogue (La Cecla, 1993) between individual and environment, space may be viewed as an explicit and concrete aspect of the layout of the places in which children have experiences (Nigris, Negri, & Zuccoli, 2007), relate to others and learn: in other words, the focus shifts from the concept of space to that of context. The relationship between individual and environment has been further emphasized by neurobiological research showing that the development of the brain, from the very earliest phases of life, is closely linked to environmental and particularly sensory experience: interaction with the environment therefore makes a

significant contribution to the formation of intelligence itself (Vecchi, 1998). It follows that the language of space has deep biological roots but is also based on cultural concepts (Rinaldi, 1998).

For these reasons, the quality of the context is increasingly subject to attention and evaluation; the latter is of particular interest when conducted from an educational perspective that focuses on the match between the educational offering provided by adults and the response from the children rather than on measuring outcomes (Bondioli & Nigito, 2008). In this sense, we may agree that the way in which the context is structured "represents a process of attribution of meaning with the aim of making the authors' (educators') intentions coincide with the readers' (clients') interpretation of them" (Franceschini & Piaggese, 2000, p. 55). Therefore the adult's task is to create competent contexts that can cater for and contribute to the development of children's potential, but also challenge their plastic and lively intelligence with offerings and assignments of an appropriate level. In this sense, context may be viewed as an "interactive text" (Mainetti & Cosmai, 2010, p. 27) that allows children to make choices, have experiences and construct knowledge.

The role of materials in the history of pedagogy

Materials are a key component of context, and as such have always been the object of study and research, starting with Comenius (1657), whose vision for education was that "things" should be encountered before words; a conception shared by Locke (1690), who discussed the relationship between contact with objects and the perceptible world on the one hand and the formulation of ideas on the other; finally Rousseau is to be credited with providing an even more explicit account of the link, already evident in early childhood, between sensory experience and teaching-learning, whereby the former lays the foundations for a "reason of the senses",

which in turn lays the bases for intellectual reason (Rousseau, 1762).

In this paper I will explore the meaning and value for education of unstructured materials, particularly those that I shall define as “unusual” or “unconventional”, on the grounds both of their lack of structure and of their relatively untapped potential in educational and school contexts. In order to provide a thorough definition of these materials and put them into context, I will now briefly review the rich and long-standing pedagogical tradition of using unconventional materials.

A first example of the use of materials is the work of Froebel (1826). Materials featured strongly in the teaching programmes at the kindergartens that he set up for young children: the discovery of materials went hand in hand with the discovery of self, insofar as within the close relationship between object and child, the former reflected aspects of the latter. The protagonists of this method were natural materials on the one hand – provided for example by outdoor gardens, both individual and communal, where the children could grow plants under the supervision of “teacher gardeners”, and on the other, the well-known Froebel “gifts” which were designed to support cognitive learning but also as aids for art and aesthetics education, and therefore also intended to elicit a type of thinking that is normally viewed as divergent.

A further step in the direction of a broader and at the same time more focused emphasis on materials, particularly unstructured materials, was taken by the Agazzi sisters (1950a), who saw intellectual, aesthetic and linguistic development as taking place through the senses and through analysis and comparison of concrete, manual and creative experiences. In the preschool they ran, in a simple and peaceful environment that had a “family” feel to it – so much so that the educator was called “vice-mother” – they used everyday materials, found on the street or in the children’s pockets, which they defined as “valueless” in the economic sense but paradoxically even more valuable from an educational

perspective: “my Museum doesn’t cost anything; it could be called the “museum of the poor”, if it were not for the fact that it contains as much and more as that of rich people: little boxes, buttons, seeds, nuts, tubes, wires, nails, pasta shapes, picture cards, little bottles, lids, remnants of fabric, paper, plaits, trinkets, little balls, little pots, bags, postcards; and a variety of materials: wax, iron, tin, marble, wood, leather, glass...” (Agazzi, 1938, pp. 12-13). These small objects, made of a diversity of materials, but all used and of little economic worth, were the “odds and ends” that the Agazzis displayed in their “museums” for children, born from their observation – as opposed to the inspection that would be typical of a more authoritarian teaching style (Zuccoli, 2010) – of the contents of children’s pockets. The Agazzi method also included more structured materials provided by the adult educator, but these “unlicensed odds and ends” were certainly its key component, as revolutionary in its simplicity as the non-interventional teaching style was effective. A further important contribution, similar in terms of adult intervention style but different in terms of the choice and presentation of materials, came from Maria Montessori. In her “House of Children” (Montessori, 1950) she implemented her method, based on designing the environment in such a way as to facilitate children’s natural and creative development. Specifically, Montessori advocated the logical organization of developmental materials, consisting of a system of objects, grouped together on the basis of given physical characteristics but in series of variations and gradations: the chosen characteristics are emphasized by presenting them in a univocal or at least circumscribed manner, and this isolation of key features makes them more obvious and accessible to children. With regard to the scientific features of the Montessori learning materials, they are designed first of all to enable children discover their own mistakes, maximising the pupils’ opportunity to work independently of teacher intervention, so that the educator’s main task is to lay out the learning environment, demonstrate correct use of the materials and systematically observe the children’s behaviour; the materials are also intended to

be aesthetically appealing and to invite the children to action; finally they are limited in quantity in order to allow the children to orient themselves amongst and place order the multiple sensations they experience (Cives, 2004).

Less well-known but highly relevant to an in-depth analysis of the theme of materials (Zuccoli, 2010), particularly unstructured materials, is the thinking of Giuseppina Pizzigoni, today applied only in the context of an educational project in Milan. Pizzigoni was even more radical than other educationalists in opening the doors of her primary school to the world and to the things of nature – which she considered to be “teachers” in their own right (Pizzigoni, 1971): materials were to be experienced rather than taught and to this end, each class in Pizzigoni’s school was involved in setting up a school museum.

The use of materials also played an important role in the methods of Freinet, and in Italy in those of the Educational Cooperation Movement [Movimento della Cooperazione Educativa (MCE)]. Freinet (1949) saw the relationship with material things as a key medium for the development of cooperative work and for rendering concrete and visible what the children were discovering and learning. He therefore introduced into the school – a radically innovative “school of doing” (Freinet, 2002) – the tools of a concrete and material craftsmanship, first and foremost the typographical tools used to produce the Freinet school newspaper. Following in this tradition, the MCE led the transformation of schools into workshops in which children could use their hands, facilitated by the provision of suitable tools amongst other methods.

In more recent times, as illustrated by the Reggio approach, the relationship between children and environment has come to the fore even more explicitly: the social construction of learning is seen as taking place within relationships with other people, but also within the research facility that is the school. It follows that a key part of the role of schools is providing a favourable context for learning (Edwards, Gandini, & Forman, 1993).

Reflection on the theme of designing spaces for children has led to clearer identification of the characteristics of such spaces and the key words defining them, at the crossroads between pedagogy and architecture (Ceppi & Zini, 1998), an area that is growing in popularity (A.a.V.v., 2005; Fortunati, Fumagalli, & Galluzzi, 2008). The spaces used as classrooms, “square” and most especially the “atelier” – the latter being the place that is primarily devoted to the languages, and therefore the materials, related to the intelligences of children that are normally least valued at school – host and support children’s encounters with instruments and objects. In line with such a perspective, the Remida project was launched in Reggio Emilia in 1996 (Giacopini, 2004). This is a Centre for Creative Recycling that promotes “the idea that refuse is a resource ... in which alternative and used materials obtained from industrial leftovers and waste are collected and displayed in order to endow them with new uses and meaning” (Ferrari & Giacopini, 2004, p. 9). Remida is representative of a host of similar projects that have sprung up both in Italy (Bagnacani & Giacopini, 2004) and abroad. These initiatives, though heterogeneous in many ways, share the common aim of introducing used and waste materials into schools in the context of sustainability projects.

The materials that enrich the context

This study was part of a broader research programme regarding objects and materials in education (Guerra & Zuccoli, 2012; Guerra & Zuccoli, in press) and had the specific aim of exploring the potential role of unstructured materials, particularly those of an informal and undefined nature such as industrial waste products, within the educational programmes of early childhood services and schools.

It is useful here to provide some preliminary definitions of what we mean by unstructured materials, while recognizing that

objects and materials may be classified in terms of multiple and frequently overlapping categories. For example, the categories most commonly used to differentiate materials include: origin, that is to say, natural (Lester & Maudsley, 2007; Guthler & Lacher, 2009) or artificial; type of use, that is to say, for play, work or some other more specific function. For the purposes of our reflection, it is important to distinguish between materials in terms of their degree of structuring. Let us therefore provide a brief overview of how we may define structured and unstructured objects and materials in education, with their respective specific features, while acknowledging that the proposed definitions are not definitive or absolute but may be revisited in line with the context and way in which they are used.

The term “object” refers to finished materials that are part of daily life in the world outside of school: the introduction of objects from the external environment is powerful to varying degrees, and displays varying characteristics, according to whether they have been sought out and brought to school by the children themselves – by chance, on their own initiative or at the teacher’s request – or by a teacher or expert (Zuccoli, 2010). In any case, as long as the adult is duly careful to present the objects in such a way as to encourage open and flexible exploration of them by the children, creative and innovative development may take place (Guerra & Zuccoli, 2012). Prominent examples in this field include the Agazzi sisters’ previously mentioned Museum of Odds and Ends or the more recent treasure basket and heuristic play approach (Goldschmied & Jackson, 1996), devised for use at infant and toddler centres, in which the educator prepares a selection of objects for the children – natural or made of natural materials, such as wood, metal, leather, fabric, rubber, fur, paper and cardboard – with a view to supporting their sensory and cognitive exploration processes.

With regard to structured materials, the definition proposed by Anolli and Mantovani still holds good: “in operative terms, play material the elements of which are linked to one another via a well-defined network of

relations. This means that the elements making up a single type of material (e.g. wooden blocks, bingo cards, sticks and so on) are related to one another in terms of similarity or difference or order or symmetry on the basis of certain characteristic variables (such as shape, colour, size etc..”) (Anolli & Mantovani, 1981, p. 17). This does not mean that unstructured materials are lacking in “structures”, but that in the materials defined as structured the reciprocal relationships between the elements – and the purposes for which they are intended – although these will vary according to the degree of structuring of the specific material – are in some sense intrinsic; these relationships have been predetermined independently of the actions of those using the material, and indeed of themselves explicitly suggest what actions users might engage in. It follows that these materials are usually intended to sustain educational objectives previously identified by the adult, predominantly via experimentation with the cognitive functions, and are less frequently called upon to elicit subjective responses, particularly those of the expressive, communicative or imaginative variety (ibidem). In this regard, Anolli and Mantovani in their paper on structured materials, which is still relevant today, point out that this does not mean that such materials do not ever facilitate creative solutions, amongst other reasons because the latter are not limited to the expressive domain. This premise is borne out but also problematized by numerous contributions on the theme of creativity that have increasingly linked it with the ability to identify divergent solutions to a range of problems on the basis of known elements combined in original ways (Vygostkij, 1930; Rodari, 1973; Munari, 1977). However, the fact remains that structured materials may be seen as favouring the use of what is defined as convergent thought, while unstructured materials in contrast may be hypothesized to stimulate the development of solutions that are alternative to predefined pathways, and therefore more truly creative insofar as more open to different interpretations. Of course, structured materials also vary amongst themselves in terms of the flexibility with which they may be used, consequently

suggesting either more open or more closed solutions. Of themselves, they do not necessarily imply that children must use them in a closed and predetermined way: this depends in any case on the ability of adult educators to adopt a balanced position along the continuum that runs from games to game-like learning (Staccioli, 1998), without over-emphasizing their own expectations regarding how these materials are to be played with or used. Nonetheless, one of the hypotheses informing the study presented here is that more unstructured materials facilitate more open forms of use, in the sense of more divergent, although this does not imply the absence of criteria or limits.

Structured materials may be defined as similar to “teaching aids”, in the sense of games that target specific learning objectives, such as dominoes, bingos or geometric shapes, and therefore more adult-centred. In contrast, unstructured materials, such as “natural” materials, everyday objects and “open” materials (paper, fabric...) do not target specific or obvious learning objectives, and are therefore more child-centred (Caggio, 2009).

More generally, we define as in contrast with structured materials those materials referred to as unstructured, that is materials that are not created for a specific didactic purpose and that in any case suggest a range of flexible and composite actions, facilitating by their nature more open combinations. Amongst these, used materials currently hold a strong position. By used we mean both materials that have already been used and have reached the end of their life cycle in terms of their original function, and industrial waste materials – the focus of the present study – or materials that are generated as surplus at the end of a production process, as a result of production errors or as remnants of other products. The latter are therefore characterized by being new and yet destined not to be used, but also as being partial and incomplete.

Waste products as unconventional and “design” materials

We define these materials as “unusual” and “unconventional”, while at the same time attributing them with a particular valence in “designing processes” as we shall later explain.

In the first place, they are considered unusual because it is still uncommon to find them in schools, although this is changing, but also because their educational potential remains to be fully explored and tapped into. The fact that they are resistant to “taming” – in the sense that they lead to outcomes that are difficult for the teacher to predict – makes them even more unwelcome guests at school. Therefore their use is often limited to incidental or random episodes that are rarely thematized or analyzed in terms of their peculiar characteristics. At the same time, they are also materials that have not been designed for didactic purposes and are therefore unconventional within the school context. Industrial waste materials may be viewed as even more unusual and unconventional than used materials, given their natural incompleteness.

In order to clarify this last statement, let us outline some of the characteristics of industrial waste materials. Firstly they are usually new, but unfinished: not yet or no longer objects, but rather “parts of”, or pieces that may be used to build other objects, therefore “attempts towards” or “reversions to raw material”, in any case fragments, deformations, evolutions or involutions of completed materials. Thus they are generally unrecognizable and not immediately definable, specific characteristics that lend them particular interest from a pedagogical and didactic perspective. Secondly, these materials are also afunctional, given that they generally have not been designed to have a function in their own right, but are intended as parts of another product, and in any case have not played an active role in the production cycle. Differently to used material, which contains and evokes the meaning and function of the object “during its lifetime”, making it

difficult to entirely do without this original meaning and function, industrial waste materials are less marked by their past history and may therefore be interpreted more freely. In this sense, they are simultaneously and paradoxically open to the polyfunctionality that may be attributed to them by those who encounter, make their own of and reinvent them: users' actions and focus may be centred on any of their partial characteristics, such as the consistency of the material, shape, colour or sound... leading to a variety of functional outcomes.

These informal materials appear to be experienced in a relatively similar way by adults and children, insofar as adults approach them with fewer preconceptions than they do known materials, and they produce a levelling of competences across generations in a sort of "democracy founded on inexperience". Zuccoli (2010, pp. 17-18) justly emphasizes that "in this relationship with 'simple objects', the adults or in any case the parties with more life experience, attribute "form" and meaning to their perceptions as soon as they encounter things, making them fit into their existing categories of knowledge, interpreting them and frequently confining their exploration of them within the boundaries of their prior expectations. In contrast, children on picking up an object, relate to it in a way that is independent of prior or predictable categories of knowledge – that is to say, of the set of relationships, meanings and values that adults have coded over the years and ultimately stigmatized – leading to a far freer mode of exploring the world". However, with regard to industrial waste materials, the adult's past experience is often as limited as the children's, placing both parties in a similar initial exploratory condition, characterized by the lack of prior experimentation and known reference points.

An additional characteristic of these materials is their ductile nature – not so much in physical or material terms as in the semantic sense – which makes them particularly open to receiving and taking on the many and diverse meanings that children may attribute to them in the course of their explorations. Thanks to this attribution of

meaning, which is fostered by the educational and didactic proposition implemented in the encounter with the children these materials come to life and may "become" something, attaining completion albeit on a provisional basis. Furthermore, these materials, if selected to be as heterogenous as possible, are naturally polysensory, bringing the polymaterial nature of the outside world into the school setting: when they are present in the school, other targeted sensory experiences or dedicated areas become unnecessary, given that of themselves the unstructured materials provide a favourable environment for perceptive and sensory exploration in multiple directions.

The features just outlined together make up a further characteristic that is key to the reflections that I will later outline: the fact that they intrinsically provide a holistic experience, in contrast with the set usages of more structured or purpose-built materials. As with all materials, but even more so given that they do not have a predetermined use, unstructured waste materials allow children to immerse themselves in rich and complex experiences that engage them in a way that is broad and yet unfragmented. Such experiences have the additional strength of being expressed indirectly, as with all forms of analogical language, which are not limited to a particular time or learning environment, but are all-pervasive and widespread.

Finally, both industrial waste and used materials contribute to economic and environmental sustainability, a key theme in the curriculum of both childhood services (Pramling & Kaga, 2008) and schools. For this reason, they can play a key role in the education of even the youngest children, with evident benefits for society both now and in the future. Indeed today more than ever, the opportunity to acquire material at almost zero cost – although the procurement, setting up and storage of the materials obviously has an associated cost in terms of the resources dedicated to it, as do all objects introduced into childhood services and schools – represents a significant advantage in financial terms. Industrial waste materials also offer benefits from an environmental protection

perspective, and may contribute to providing children with an environmental education that is relevant to their everyday lives, readily understandable and illustrative of the many advantages associated with making intelligent use of the available resources (Kelly & Lukaart, 2005).

The training-research project

The reflections presented here were developed in the course of a training-research study that involved planning, testing and systematically observing preschool teaching projects, with the primary aim of identifying the actions undertaken by the children when they encountered the materials under study. Specifically, over 20 teaching projects were implemented during training practice by fourth year students of the degree course in Primary Education at Milano-Bicocca University in fulfilment of their undergraduate thesis requirement. The projects were developed in conjunction with the centre for creative reuse, Remida@Muba di Milano, who briefed the students about the materials and how to procure them. The individual projects were documented via paper and pencil descriptive protocols, audio and video recordings and photographs. The data was analyzed by the trainee teachers themselves, discussed with the lecturers and shared in peer group contexts. The group dimension was carried on after the conclusion of the projects, leading to the setting up of a permanent interest group on the theoretical and methodological aspects of materials in schools, in keeping with an approach that views the teacher as engaged in “experimentation-research”, in which “the behaviour of the children and the educator as well as the characteristics of the situation are all viewed as variables that interact and influence one another, in a system of relationships in which each component is a function of the other components” (Anolli & Mantovani, 1981, p. 15).

Our own training-research study had the specific aim of exploring, observing and

documenting the potential uses of materials that were both highly unstructured and little known to children, such as industrial waste products.

One of the leading research hypotheses was that the use of highly unstructured materials, given that they are either unfinished or part of other objects, would stimulate novel play and learning experiences in a contemporary manner, and would also encourage experimentation with divergent strategies not only of the expressive, affective and communicative kind as is generally acknowledged, but also of the cognitive kind, whether perceptive, scientific, logical or linguistic. In general the literature in this field is limited and mainly focused on experiential accounts (e.g., Gordon-Smith, 2010; Grindley, 2010): some of the studies that have examined the role of unusual materials such as industrial waste in education have explored the artistic aspect, suggesting that these materials allow children to try out and generate connections, to transform and reinvent, thus promoting creative thinking (Eckhoff & Spearman, 2009), while others have investigated the role of unstructured materials in supporting the expression and sharing of thoughts and feelings (Gandini, 2005).

Although I do not view unstructured materials as necessarily in opposition to structured objects, but rather am convinced that each of these types of material is complementary to the other in educational and school contexts, the characteristics and hypothesized outcomes of the use of unstructured materials suggest the value of conducting an in-depth investigation into their potential.

The exploratory phase as a crucial element of project design

The initial phase of the project design played a vital role in the refinement of the hypotheses outlined above. Each of the trainee students began their projects with a preliminary observation phase aimed at identifying the types and structures of spaces

and materials available to each group of children, as well as the extent to which each kind of space and material was used and in what ways. Following this phase, the projects were initiated by openly presenting the new materials, that is to say, by placing no requirements on the children other than inviting them to explore the materials.

This is what we may define as the familiarization or spontaneous phase, which is clearly illustrated in the work of Pujol & Roca – who first presented the children with a space solely occupied by unstructured materials and then defined how to continue the project on the basis of the experiences that emerged on initial exposure to the materials (1995) – and falls within what we may define as a highly explorative approach (Guerra, 2013) for both the adult and the children. When children are provided with the opportunity to explore materials at length and in detail – as has already been pointed out, for example by Garvey (1977) in reference to numerous studies on the use of objects in children's play - the latter catalyze meaning-seeking processes in even the youngest children, not alone facilitating the identification of creative solutions, but also enhancing the quality of play. In this regard, an interesting study conducted at infant and toddler centres and preschools showed that experimentation that is not directed by the adult not only leads to discrete learning outcomes, but actually sets off a train of reflection that will be as complex as the children are left free to carry out their explorations (Galardini, Giovannini, Mayer, & Musatti, 1995).

It should be pointed out that this phase nonetheless takes place within a context that has been predefined by the adult and therefore the children's opportunities to exercise choice are bound by a pre-established framework. In this regard, the choice of context falls under the educational responsibility of the adult, who should define it in line with preliminary hypotheses based on prior questions and observations (Guerra, 2008). In this sense, it is clear that the initial choice of the materials to be made available to the children is not a secondary element of teachers' project design processes but will

play a major part in determining outcomes. In the present study, exploration of the unstructured materials took place over regularly scheduled (as opposed to sporadic) and extensive periods of time, in order to promote familiarization with them at different levels, with the aim of promoting diversified forms of experience. This approach was in contrast with unidirectional suggestions or requests on the part of adults, particularly those targeting predefined and closed productions. In line with the research objectives, the student teachers strove to provide open situations, understood as opportunities to experiment with and manipulate reality, and viewed as critical to facilitating the development of creative thinking in children (Munari, 1977). If children are not familiar with the materials, and the potential and opportunities afforded by them, they cannot form the creative relationships that are only possible when they have adequate prior knowledge of the elements.

In this phase of the research, the materials were offered to the children in a dedicated context in which they were neatly laid out on the ground, on shelves or in containers that were usually transparent and uniform in size. The issue of initial layout is of critical importance: other research - for example in the field of the environmental psychology of play - suggests that presenting the materials in an orderly as opposed to in a confused manner, not only fulfils the adult's need for order and encourages the children to develop their cognitive categorization abilities, but also provides the latter with a more stable environment within which they can orient themselves more easily (Varin, 1985). The positioning of the materials and the degree of order and rigour with which they are presented to the children, are therefore a prerequisite for children's natural and individual research activity, in the sense of allowing them to avail of what is given and to bring as much competence to the encounter with it as possible. Nonetheless the order in question is not based on univocal criteria, but on the "untidy" presentation of mixed and heterogeneous materials, as exemplified by Rosa Agazzi (1950a), which in itself acts as a

stimulus eliciting the search for meanings, categories and classifications: a stimulus that is for the children's use, in their own time and at their own hands, an order that they must seek out for themselves. The rigour of the materials offered and their presentation as designed by the adult is thus the key structure that supports the children in undertaking many different lines of enquiry.

The lay out of the materials was designed to minimize univocal logics of similarity, difference or contiguity so as to avoid prompting particular actions or ways of thinking, and so as to maximise access and choice on the part of the children. The aesthetic dimension was also prioritized in terms of presenting the materials in as attractive and appealing way as possible. In this perspective, the student teachers generally adopted the recommendation of the Remida centres to present the materials following the criteria of seriality, variety and quantity, in order to make their potential more immediately obvious. Beginning from these initial open propositions, as the projects progressed, a specific research focus was developed for each. Successive and progressive observations of the groups of children allowed the researchers to identify the principal types of use and play elicited by exposure to the materials and to construct initial hypotheses regarding the related competences, interests and needs.

The actions making up the children's experimentation activities

I now present a summary of the main directions emerging from the documentation of the observed projects, in the form of refined hypotheses requiring further research. The projects gave rise to several different types of complex experience, all of which were characterized by holistic exploration although each had its own specific focus (Bongiascia, 2012; Frigerio, 2012; Imperiale, 2012; Marchesi, 2012; Mazzolati, 2012; Rainoldi, 2012; Raiteri, 2011; Sala, 2012; Sardi, 2011;

Sartirani, 2012; Tasca, 2011; Todeschini, 2012; Valli, 2012; Vercesi, 2013).

Firstly, as we shall see, an intense bodily and sensory dialogue was observed between the children and the materials in all the projects (Munari, 1985; Restelli, 2002) but this did not preclude the children from experimenting with the use of language and terminology. The development of language through the medium of humble materials had already been observed by the Agazzi sisters (1950b), who used them to support children's linguistic exploration, starting from objects and searching for the corresponding words and meanings; in the same way, materials may provide rich opportunities for the elaboration of concepts and knowledge. In the case of the unstructured materials used in this study, the fact that it was difficult if not impossible to recognize, identify and therefore name them, made constructing a synthetic and univocal definition of them a complex task; this led the children to spontaneously search for complex definitions based on the features, qualities and opportunities for action offered by the explored materials. These efforts on the part of the children facilitated gains in the domain of linguistic pertinence, as borne out by the children's increasing ability to find more precise terms to describe the materials used, in constructing definitions that on the one hand became progressively more detailed and on the other described the specific characteristics of each material with progressively greater clarity.

At the same time, the children also engaged in linguistic invention both in order to compensate for the lack of synthetic definitions, and because it developed the more symbolic dimension of their encounter with the materials. Many other research experiences have highlighted the symbolic potential of materials, attributable to their intrinsic "non-literality" (Bondioli & Savio, 1994; Bondioli, 1996; Braga, 2009), that makes them suitable instruments for pretend play. The informal nature of the materials used in this study naturally encouraged decontextualized actions and subsequently the construction and invention of stories; these were basically narrations that drew their main characters from

amongst the elements/objects present in the materials and had them encounter one another in the context of imaginary relationships. Indeed, this kind of material may also be described as “iconic”, that is to say, it represents “a sensation that is recorded directly rather than being communicated through metaphors. It is expressed in a transversal language that falls somewhere in between the ‘ecological aesthetics’ of nativism (a recent blending of the perennial ecologism and conservative vernacularism) and the ‘aesthetic ecology’ of minimalism (a late but effective offshoot of Modernism)” (Barbara, 2000, p. 113). In parallel, these materials are also richly symbolic in that they lend themselves to being defined through metaphors in a game of continuous and successive transformations that take place according to the framework in which the material is placed.

A related area of research engaged in by the children is that of scientific enquiry. This brings into play aspects of mathematics and physics, which on the basis of the characteristics identified in the materials, promote the natural construction of categories and catalogues. These classifications become progressively more refined, going well beyond those traditionally proposed by the adult thanks to the children’s growing ability to detect and identify details that allow them to make daring associations in terms of similarity, difference or gradualness. When attention is paid to multiple characteristics of the materials, such as shapes, sizes, colours, surfaces, weights, forces and equilibria, this sets off processes of complex reasoning and the pursuit of different lines of scientific enquiry. This enquiry is rooted in experience, within timeframes and in ways that make it a matter of urgency and yet comprehensible, for the children engaging in it. In this regard, the involvement of the entire body – as borne out by the numerous and detailed sensory explorations observed throughout all of the educational projects in this study – appears to promote investigation of the relationships between self and materials; the latter provide children with the opportunity to conduct concrete experiments testing what is possible and what they know,

for example in terms of spatial relationships and numbers.

A further area of enquiry pursued by the children was in the domain of composition. They progressively explored the aesthetic qualities of the materials, in all their dimensions (visual, sound, etc.) and possible combinations, using the different senses and exploring the artistic potential of the materials more as an expressive than as a realistic-figurative medium. Artistic expression was favoured by a personal and genuinely exploratory approach to the materials.

A final aspect of interest is the holistic nature of the experience facilitated by the use of industrial waste products. On the one hand, these materials appeared to prompt the sharing of ideas and the comparison of theories. This may be attributed to their intrinsically problematic and problematizing character which gives rise to a natural form of problem-solving. Their lack of a direct and univocal function makes them a particularly fertile resource for children, who in using them are led to ask questions and adopt investigative approaches. This is particularly the case in the transition from the exploratory phase to the construction and design phase, that is to say from the generation of random combinations to the planning of constructive actions (Piaget, 1937). On the other hand, they were also found to act as a powerful mediator of emotions, given that they were frequently described in terms of the feelings they evoked or brought to mind while using them. This bears out the claim that “listening to” materials brings traces of their identity to light, as well as calling to mind our own past experiences (Gandini & Kaminsky, 2003).

Some final reflections

On the basis of the initial hypotheses and the documentation collected, which we have analysed and interpreted here with particular regard to the actions undertaken by the children in their preliminary explorations of the materials, we may conclude with some reflections which are as yet provisional but

appear to provide valuable indications for future research.

The recorded observations appear to confirm the intrinsic "multidisciplinarity" of industrial waste products, which supports simultaneous exploration in a number of different directions. This is probably related to the unstructured nature of the materials and their related polyvalence. The same initial exploratory activity can lead children to engage in different kinds of enquiry, spanning the sensory, symbolic, linguistic, scientific, artistic-expressive and constructive-design domains. The opportunities offered simultaneously by the use of the materials, which become proportionately greater the more the materials are undefined and therefore "open", facilitate research activities that are complex but also contiguous. Industrial waste products therefore provide a holistic experience, in contrast with the fragmentation of knowledge characterizing more guided educational activities that tend to split children's exploration into discrete fields of experience.

A further dimension identified concerns the "non-linear complexity" of the materials under study: they do not appear to give rise to a progression of difficulty from the simple to the complex, but rather incremental knowledge of their characteristics and therefore incremental competence in using them. These materials seem to simultaneously offer numerous and diverse ways of using them and therefore multiple and diverse kinds of difficulties. This facilitates progressively more complex combinations, thereby promoting creativity, understood as the ability to generate new connections between items of information, thoughts and objects: connections that constitute original solutions for the subject making them. Creative thinking is defined here as a particular cognitive form implemented by means of a design method that can create relationships transforming both subjects' knowledge of reality and their ability to solve the problems that it poses (Munari, 1981).

These first two characteristics also imply that the materials under study offer a

response to the individual interests and needs that exist within a group. Therefore the same activity, by virtue of its open nature and the multiple lines of enquiry that it promotes, allows each child to satisfy its own personal curiosities via explorations that are parallel but different to those of its peers, and are therefore more likely to be in line with its own interests and skills and consequently to take place in its current zone of proximal development. Alongside this potential to respond to individual needs, these materials offer in parallel the opportunity to preserve the social dimension of learning, in terms of spontaneous exchanges of experience, in which each child can contribute its own intelligences and specific qualities. In this sense, the materials may be seen as mediating both learning and relationships, because they bring children's common and yet different interests to the fore in a way that more structured activities do not do to the same degree.

As an aside, I flag the fact that interesting projects such as the Toy-free Kindergarten launched some years ago in Munich and replicated in other parts of Germany with the aim of preventing addictions from earliest childhood, have shown that modifying the contexts available to children by offering them highly unstructured situations contains a potential that goes well beyond the aspects traditionally identified. In this example, the project involves removing all the toys from a given classroom for a three-month period, leaving only the furniture, and providing materials such as paper, pencils, scissors as they are requested ... Evaluation has pointed up multiple effects of this type of experimentation on the modes and complexity of children's play, but also on the reflections that a less compulsive and more creative offering of solutions prompts in the educators and parents (Schubert & Strick, 1996).

In line with the reflections just outlined, a final consideration regards the effects of experimentation with highly unstructured materials on the role of the adult. The experiences promoted by the materials under study appear to place the teacher too in a particular research condition (Guerra, 2013),

parallel though different to that of the children. Specifically, these materials appear to demand - on account of their unstructured and therefore purposeless character - that teachers be prepared to take on the role of observer vis-à-vis the unfolding educational process which does not lend itself to being predefined. It would seem that the use of these materials requires a methodological approach that demands a high level of competence in educational models and techniques on the part of the adult and which is resistant to predefined programming. In this sense, highly unstructured materials appear to intrinsically require both adults and children to engage in planning and research. For these reasons, we recommend further research (Guerra & Zuccoli, in press) on the educational potential of using these materials.

References

- A.A.V.V. (2005). Creare gli spazi: architettura e design per la prima infanzia. *Bambini in Europa*. Azzano San Paolo (Bg): Edizioni Junior.
- Agazzi, R. (1950a). *Guida per le educatrici dell'infanzia*. Brescia: La Scuola Editrice.
- Agazzi, R. (1950b). *La lingua parlata: esercizi pratici ad uso della scuola di grado preparatorio e delle prime classi elementari*. Brescia: La Scuola Editrice.
- Agazzi, R. (1938). *Come intendo il museo didattico nell'educazione della infanzia e della fanciullezza*. Brescia: La Scuola editrice.
- Anolli, L., & Mantovani S. (Eds.) (1981). *Giochi finalizzati e materiale strutturato*. Milano: Franco Angeli.
- Bagnacani, S., & Giacomini, E. (2004, November). La rete dei Remida. *Bambini*, Azzano San Paolo (Bg): Edizioni Junior, 28-33.
- Barbara, A. (2000). *Storie di architettura attraverso i sensi*. Milano: Bruno Mondadori
- Bondioli, A., & Nigito, G. (Eds.) (2008). *Tempi, spazi, raggruppamenti*. Azzano San Paolo (Bg): Edizioni Junior.
- Bondioli, A. (1996). *Gioco e educazione*. Milano: Franco Angeli.
- Bondioli, A., & Savio, D. (1994). *Osservare il gioco di finzione: una scala di valutazione delle abilità ludico-simboliche infantili (SVALS)*. Azzano San Paolo (Bg): Edizioni Junior.
- Bongiascia, I. (2012, June). Narrare giocando. *Bambini*, Parma: Edizioni Junior-Spaggiari, 50-51.
- Braga, P. (Ed.) (2009). *Gioco, cultura e formazione. Temi e problemi di pedagogia dell'infanzia*. Azzano San Paolo (Bg): Edizioni Junior.
- Bronfenbrenner, U. (1979). *Ecologia dello sviluppo umano*. Trad. it. Bologna: Il Mulino, 1986.
- Caggio, F., (2009). Coltivare sensibilità. Cosa dare fra le mani a un bambino?. In P. Braga (Ed.), *Gioco, cultura e formazione. Temi e problemi di pedagogia dell'infanzia*, Azzano San Paolo (Bg): Edizioni Junior, 117-160.
- Cepi, G., & Zini, M. (Eds.) (1998). *Bambini, spazi, relazioni*. Reggio Emilia: Reggio Children.
- Cives, G. (2004). *Maria Montessori pedagogista complessa*. Pisa: Edizioni ETS.
- Comenio, J. A. (1657). *Grande Didattica*. Trad. It. Firenze: La Nuova Italia, 1993.
- Eckhoff, A., & Spearman, M. (2009). Rethink, Reimagine, Reinvent: The Reggio Emilia Approach to Incorporating Reclaimed Materials in Children's Artworks, *Art Education*, 62 (2), 10-16.
- Edwards, C., Forman, G., & Gandini, L. (Eds.) (1993). *The hundred languages of children: The Reggio Emilia approach to early childhood education*, Norwood, NJ: Ablex Publishing.

- Ferrari, A., & Giacomini, E. (Eds.) (2004). *REMIDA day. Muta...menti*, Reggio Emilia: Reggio Children.
- Franceschini, G., & Piaggese, B. (2000). *La progettazione degli spazi nella scuola dell'infanzia*, Milano: Franco Angeli.
- Freinet, C. (1949). *Nascita di una pedagogia popolare*, trad. it. Roma: Editori Riuniti, 1973.
- Freinet, C. (2002) (Eynard, R., Ed.). *La scuola del fare*, Azzano San Paolo (Bg): Edizioni Junior.
- Frigerio, S. (2012, September). Ideatori, costruttori, progettisti. *Bambini*, Parma: Edizioni Junior-Spaggiari, 76-78.
- Fröbel, F. (1826). *L'educazione dell'uomo*. Trad. it. Firenze: La Nuova Italia, 1993.
- Galardini, A. L., Giovannini, D., Mayer, S., & Musatti, T. (Eds) (1995, June). Di fronte agli oggetti. I primi passi dei bambini nella sperimentazione scientifica, *Bambini-dossier*, XI, 6, 1-32.
- Gandini, L. (2005). From the beginning of the *atelier* to materials as languages: Conversations with Reggio Emilia. In L. Gandini, L. Hill, L. Cadwell, & C. Schwall (Eds.), *In the spirit of the studio: Learning from the atelier of Reggio Emilia*. New York: Teachers College Press, 6-15.
- Gandini, L., & Kaminsky, I. (2003). Remida, the creative recycling center in Reggio Emilia: An interview with Elena Giacomini, Graziella Brighenli, Arturo Bertoldi and Alba Ferrari. *Innovations in Early Education*, 12(3), 1-13.
- Fortunati, A., Fumagalli, G., & Galluzzi, S. (2008). *La progettazione dello spazio nei servizi educativi per l'infanzia*. Azzano San Paolo (Bg): Edizioni Junior.
- Gariboldi, A., & Cardarello, R. (Eds.) (2012). *Pensare la creatività*, Parma: Edizioni Junior-Spaggiari.
- Garvey, C. (1977). *Il gioco. L'attività ludica come apprendimento*. Trad. It. Armando, Roma, 1979.
- Giacomini, E. (2004, May). Tra oggetti trovati e soggetti cercati. Remida, il Centro di Riciclaggio Creativo di Reggio Emilia. *Bambini*, Azzano San Paolo (Bg): Edizioni Junior, 66-69
- Goldschmied, E., & Jackson, S. (1994). *People under three*. London: Routledge.
- Gordon-Smith, P., (2010, March). All about... Learning with recycled materials. *Nursery world*, 4, 18-23.
- Grindley, L. (2010, September). The Midas Touch. *Nursery world*, 2, 16-17.
- Guerra, M. (2008), *Progettare esperienze e relazioni. Azioni, contesti, sperimentazioni e formazione nei servizi educativi per l'infanzia e le famiglie*. Azzano San Paolo (Bg): Edizioni Junior.
- Guerra, M. (2013, February). L'insegnante esploratore. *Bambini*, Parma: Edizioni Junior-Spaggiari, 26-29.
- Guerra, M., & Zuccoli, F. (2012). Finished and unfinished objects: supporting children's creativity through materials. *Procedia - Social and Behavioral Sciences*, 51, 721-727.
- Guerra, M., & Zuccoli, F. (in press). Materials from Childhood to Adulthood. *Procedia - Social and Behavioral Sciences*.
- Guthler, A., & Lacher, K. (2009). *Land art avec les enfants*. Barcelone: La Plage.
- Imperiale, S. (2012, October). Guardate questo che ho trovato!. *Bambini*, Parma: Edizioni Junior-Spaggiari, 66-68.
- Kelly, D., & Lukaart., S. (2005). The hive project: Building community and supporting environmental awareness through recycled materials. *Innovations in Early Education*, 12, (3), 14-18.
- La Cecla, F. (1993). *Mente locale*, Milano: Elèuthera.
- Lester, S., & Maudsley M., *Play, naturally. A review of children's natural play*, Play England, London, 2007
- Lewin, K. (1951). *Il bambino nell'ambiente sociale*. Trad. it. Firenze: La Nuova Italia, 1976.

- Locke, J. (1690). *Saggio sull'intelletto umano*. Trad. it. Milano: Bompiani, 2004.
- Mainetti, D., & Cosmai, L. (2010). *Gli spazi e i materiali nei servizi e nelle scuole dell'infanzia*. Azzano San Paolo (Bg): Edizioni Junior.
- Marchesi, S. (2012, February). Giocare la creatività. *Bambini*, Parma: Edizioni Junior-Spaggiari, 78-79.
- Mazzolati, C. (2012, April). Tocco, sento, racconto. *Bambini*, Parma: Edizioni Junior-Spaggiari, 50-51.
- Montessori, M. (1950). *La scoperta del bambino*. Trad. It. Milano: Garzanti, 1969.
- Munari, B. (Ed.) (1985). *I laboratori tattili*. Bologna: Zanichellii.
- Munari, B. (1981). *Da cosa nasce cosa. Appunti per una metodologia progettuale*. Roma-Bari: Laterza.
- Munari, B. (1977). *Fantasia*. Roma-Bari: Laterza.
- Nigris, E., Negri, S.C., & Zuccoli, F. (Eds.) (2007), *Esperienza e didattica. Le metodologie attive*. Roma: Carocci.
- Piaget, J. (1937). *La costruzione del reale nel bambino*. Trad. it. Firenze: La Nuova Italia, 1973.
- Pizzigoni, G. (1971). *Le mie lezioni ai Maestri della Scuole Elementari d'Italia*. Brescia: La Scuola Editrice.
- Pramling Samuelsson, I., & Kaga, Y. (Eds.) (2008), *The contribution of early childhood education to a sustainable society*. Paris: Unesco.
- Pujol, M., & Roca, N. (1995). *Lavorare per progetti nella scuola materna*. Firenze: La Nuova Italia.
- Rainoldi, L. (2012, May). Suoni nascosti. *Bambini*, Parma: Edizioni Junior-Spaggiari, 54-55.
- Raiteri, F. (2011, October). Il bianco e il nero. *Bambini*, Parma: Edizioni Junior-Spaggiari, 68-69.
- Restelli, B. (2002). *Giocare con tatto. Per una educazione plurisensorye secondo il metodo Bruno Munari*. Milano: Franco Angeli.
- Rinaldi, C. (1998). L'ambiente dell'infanzia. In G. Ceppi, M. Zini (Eds.), *Bambini, spazi, relazioni: metaprogetto di ambiente per l'infanzia*. Reggio Emilia: Reggio Children.
- Rodari, G. (1973). *Grammatica della fantasia*. Torino: Einaudi.
- Rousseau, J.J. (1762). Emilio o dell'educazione. In *Opere*, trad. It. Roma: Armando, 1989.
- Sala, P. (2012, December). Una risorsa educativa "naturale". *Bambini*, Parma: Edizioni Junior-Spaggiari, 66-68.
- Sardi, S. (2011, November). Carte d'identità per materiali imperfetti. *Bambini*, Parma: Edizioni Junior-Spaggiari, 52-53.
- Sartirani, F. (2012, March). Tempo lento. *Bambini*, Parma: Edizioni Junior-Spaggiari, 60-61.
- Schubert, E., & Strick, R. (1996). *Spielzeugfreier Kindergarten ein Projekt zur Suchtprävention für Kinder und mit Kindern*. München: Aktion Jugendschutz, Landesarbeitsstelle Bayern e.V.
- Staccioli, G. (1998). *Il gioco e il giocare*. Roma: Carocci.
- Tasca, I. (2011, December). Ho imparato a fare le idee. *Bambini*, Parma: Edizioni Junior-Spaggiari, 70-71.
- Todeschini, C. (2012, November). Che forma ha quella nuvola?. *Bambini*, Parma: Edizioni Junior-Spaggiari, 64-66.
- Valli, L. (2012, January). Equilibri in gioco. *Bambini*, Parma: Edizioni Junior-Spaggiari, 64-65.
- Varin, D. (Ed.) (1985). *Ecologia psicologica e organizzazione dell'ambiente nella scuola materna*. Milano: Franco Angeli.
- Vecchi, V. (1998). Quale spazio per abitare bene una scuola?. In G. Ceppi, M. Zini (Eds.), *Bambini, spazi, relazioni:*

metaprogetto di ambiente per l'infanzia.
Reggio Emilia: Reggio Children.

Vercesi, R. (2013, January). La creatività nei giochi e nelle narrazioni. *Bambini*, Parma: Edizioni Junior-Spaggiari, 65-67.

Vygostkij, L. S. (1930). *Immaginazione e creatività nell'età infantile*, trad. It. Roma: Editori Riuniti University Press, 2010.

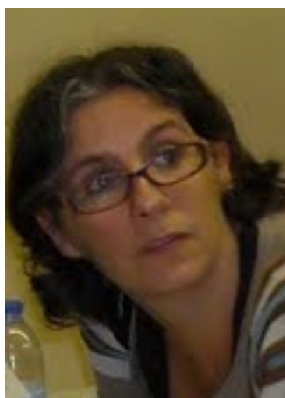
Zuccoli, F. (2010). *Dalle tasche dei bambini... Gli oggetti, le storie e la didattica*, Parma: Edizioni Junior.

Article ended in January 28, 2013

Reference:

Guerra, M. (2013). *Unconventional materials at school: teaching experiences and educational potential..* RELAdEI (Revista Latinoamericana de Educación Infantil), Vol. 2(1), pp. XX-XX. Published in <http://redaberta.usc.es/reladei>

About the author



Mónica Guerra

University of Milan-Bicocca, Milan, Italy

Mail: monica.guerra@unimib.it

Monica Guerra is a Lecturer in Didactics and Educational Research at the Education and Human Sciences Department of the University of Milano-Bicocca, where she teaches "Teaching Mediation and Group Strategies" and "Theories and Practices in Educational Communication" as well as coordinating the postgraduate course in the Languages and Techniques of Theatre in Education. She carries out research and training activities in the context of childhood and family services and schools. She is vice-chairperson of the Gruppo Nazionale Nidi Infanzia. Her academic publications include: *Progettare esperienze e relazioni* (Edizioni Junior, 2008); *La relazione con le famiglie nei servizi e nelle scuole per l'infanzia* (Edizioni Junior, 2009, with E. Luciano); *Tra scuola e teatro. Per una didattica dei laboratori teatrali a scuola* (Franco Angeli, 2011, with R. Militello); *Finished and unfinished objects: supporting children's creativity through materials* (Procedia - Social and Behavioral Sciences, 2012, 51, with F. Zuccoli); *Dalla parte del futuro. Risignificare parole e pratiche nei luoghi dell'infanzia* (Edizioni Junior, 2013, Ed.).